GulfofMexicoSPU

Deepwater Horizon Response

Skimming, Sorbent Pickup and Barge Operations

Air Monitoring Plan

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Deepwater Horizon Incident

LOCATION: HOUMA

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Approved by:

IC (Name, Signature & Date)	
FOSC (Name, Signature & Date)	
SOSC (Name, Signature & Date)	

This plan has also been reviewed and agreed by:

Agency/ Team/ Name: (Name, Signature & Date)	
Agency/ Team/ Name: (Name, Signature & Date)	
Agency/ Team/ Name: (Name, Signature & Date)	
Agency/ Team/ Name: (Name, Signature & Date)	

Prepared For:

MC 252 Houma Incident Command - Safety Officer

Prepared By:

Cheryl Metzler

Scott Skelton, Glenn Millner – CTEH

Naureen Badmus, Fred Tremmel, Penny Goodstein, – BP,

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1 Introduction

This plan is intended to minimize the risks to workers who are performing Spill Control Operations for the Deepwater Horizon incident and ensure personnel do not exceed established PELs. The origin of the oil released from the incident is located approximately 50 miles southeast of Venice, Louisiana and has the potential to impact the shoreline, offshore assets, drilling rigs and other operations with oil. Spill control efforts have been organized in an effort to recover crude oil and minimize impact to shoreline throughout the Gulf Coast.

Spill control operations include;

Skimming oil near the source (MSRC, NRC)

Barge storage operations between the source and shore (MSRC, NRC)

Skimming oil and sorbent pickup between the source and shore (FVSF)

Other operations (e.g. specialized centrifuge vessels)

The purpose of this air monitoring plan is to ensure safe atmospheric work environments during the recovery and cleanup of crude oil.

Real time air monitoring and analytical air sampling will be focused on the following areas;

- Monitor the breathing zone air on vessels to ensure safe work environments
- Monitor workers involved in spill control activities to ensure worker protection.
- Monitor specific activities to support safe operations.

Real-time and personal air monitoring will continue until the spill control operations are complete. Air monitoring and sampling data will be summarized and reported to Unified Command through the Houma IMT Safety Officer.

A risk-based approach will be employed in the implementation of this plan and will involve monitoring criteria based on the anticipated hazards and planned activities.

This air monitoring plan does not address Source Control, Nearshore/Onshore Decontamination, Post Oil Landfall, In Situ Burning, or Community Air Sampling, all of which are covered in other documents.

2 Real-Time Air Monitoring Instrumentation

The term “real–time” refers to direct reading instruments that allow nearly instantaneous determinations of a chemical concentration in air. Real-time measurements provide immediate information for worker and community exposure scenarios and, with the use of appropriate site safety measures, provide an early-warning action levels in sufficient time to prevent overexposures. Real-time measurements are not directly comparable to OSHA or ACGIH 8-hour TWA values or to community exposure standards or guidelines. Instantaneous real-time readings do not necessarily

represent conditions experienced throughout the workday and can underestimate or overestimate exposures potentially experienced by workers. Real-time instruments perform sampling and analyses within the instrument allowing concentration readings to be obtained in real-time. Real-time air monitoring for Volatile Organic Compounds [VOCs] will be performed using photo-ionization detectors (PIDs) and the UltraRAE or comparable benzene monitor [pids or detector tubes]. The PIDs will be used to detect volatile organic components of the crude oil.

The UltraRAE or manufacturer comparable instrument and/or detector tubes will be used for benzene specific analysis in the event that elevated VOCs are detected using a PID. The UltraRAE is equipped with a 9.8 eV lamp.

Real-time monitoring will be conducted using multi-gas detectors (e.g. Rae Systems AreaRAE) with:

PID equipped with 10.6 eV lamps for volatile organic compounds (ppm)

Catalytic bead sensor for 0-100% lower explosive limit (LEL%)

Additional electrochemical sensors that measure Oxygen (%), Hydrogen Sulfide (ppm) and Carbon Monoxide (ppm)

3 Monitoring Locations

3.1 Skimming oil near the source (MSRC, NRC)

Industrial Hygiene/Safety technicians (air monitoring technicians) are present on all MSRC/NRC vessels and perform hourly air monitoring. Vessel operators will work with the Industrial Hygiene/Safety technicians to select real-time monitoring locations in common work areas and inside crew quarters. Additional monitors may be placed near the edge of the vessel or in other areas of interest to gain early indications of rising LEL levels. Handheld monitors are also available to sample in real-time for LEL, VOCs, H2S, and benzene. Manually logged real-time data for benzene will be collected and reported on approved field forms at prescribed intervals. This data will be shared with response stakeholders.

After initial characterization of the immediate work site has been completed, air monitoring will be continued at regular intervals in the vicinity of operations being conducted. The air monitoring results shall be sent to the BP Industrial Hygiene Unit Leader in Houma 281-336-8176 for review at intervals not to exceed 12 hours. At no time shall air monitoring activities impede operations or endanger personnel.

The Air Monitoring Technician or Industrial Hygienist will determine location(s), time and duration of air monitoring. Where continuous monitoring instrumentation is not installed, the Air Monitoring Technician will default to monitoring every hour or as conditions change until personnel suspend operations or depart the work site. In addition to general area monitoring aboard vessels, a specific request has been made to conduct air monitoring by exhaust vents or ballast vents which discharge

into the work area. If conditions change (such as the amount of oil in the work area, an increase in a reading of VOCs, or a shift in the winds towards the workers, for example), air monitoring should be done immediately following the change, and the need to monitor more frequently should be considered. Spill control site personnel and supervisors shall be updated regularly of the air monitoring results. At minimum, the Air Monitoring Technician shall update the Vessel Captain and Task Force Leader of levels over the preceding 12 hours once per shift.

3.2 Barge operations

Safety technicians (air monitoring technicians) are present on the barges to perform air monitoring. The safety technicians will select real-time monitoring locations across the barge work areas. The Safety technicians are available to respond to areas of interest to gain early indications of rising LEL levels. Handheld monitors are available to sample in real-time for LEL, VOCs, H2S, O2 and CO. Manually logged real-time data will be collected and reported on approved field forms at prescribed intervals. This data will be shared with response stakeholders.

3.3 Skimming oil and sorbent pickup between the source and shore

The majority of skimming oil and sorbent pickup between the source and shore is conducted by Fishing Vessel Skimming Fleet (FVSF), formally known as the Vessels of Opportunity.

Industrial Hygiene technicians (air monitoring technicians) are present on a dedicated IH vessel accompanying each Task Force (1-12) to perform air monitoring. Vessel operators will work with the Industrial Hygiene technicians to select real-time monitoring locations across the task force work areas. The Industrial Hygiene technicians are available to respond to areas of interest to gain early indications of rising LEL levels. Handheld monitors are available to sample in real-time for LEL, VOCs, H2S, O2 and CO. Manually logged real-time data will be collected and reported on approved field forms at prescribed intervals. This data will be shared with response stakeholders.

After initial characterization of the immediate work site has been completed, air monitoring will be continued at regular intervals in the vicinity of operations being conducted. The air monitoring results shall be sent to the Industrial Hygiene Unit Leader in Houma for review at intervals not to exceed 12 hours. At no time, though, shall air monitoring activities impede operations or endanger personnel.

The Air Monitoring Technician will determine location(s), time and duration of air monitoring. The Air Monitoring Technician will default to monitoring every hour or as conditions change until personnel suspend operations or depart the work site. In addition to general area monitoring aboard vessels, a specific request has been made to conduct air monitoring by exhaust vents or ballast vents which discharge into the work area. If conditions change (such as the amount of oil in the work area, an increase in a reading of VOCs, or a shift in the winds towards the workers, for example), air monitoring should be done immediately following the change, and the need to monitor more frequently should be considered. Spill control site personnel and supervisors shall be updated regularly of the

air monitoring results. At minimum, the Air Monitoring Technician shall update the Task Force Leader of levels over the preceding 12 hours once per shift.

3.4 Other operations

Other operations (e.g. specialized centrifuge vessels) that do not fall within existing monitoring plans will be reviewed by the Industrial Hygiene Unit Leader and appropriate monitoring requirements will be specified.

4 Site Action Levels

Site action levels have been established for airborne hazards. Vessels should execute their own safety evacuation/emergency response plan when action levels are exceeded.

NOTE: The intent of this plan is to avoid the mandatory use of respirators. When action levels are exceeded, vessel will reposition upwind of high concentration area. Approach the visible spill area from upwind [wind direction parallel with vessel] with continuous monitoring of Vessel. The vessel will then work into spill area from outer boundary taking smaller concentrations of oil. Evacuate if actions levels continue.

Action Levels for Personal Exposure

Chemical	Action Level (all deck and living areas)	Monitoring Condition	Actions
VOC, ppm	50	Continuous levels for > 15 minutes	Consider correction factors to compensate for isobutylene calibration gas or refer to correction factor chart provided by manufacturer. Readings taken at breathing zone level Reposition Vessel until readings decrease Take additional benzene specific readings to determine benzene levels.
Benzene, ppm	0.5 (on deck or in living quarters)	At least 3 samples over 15 minutes	Take readings when VOC's exceed 50 ppm Reposition Vessel until readings decrease
Carbon monoxide, ppm	25	Continuous levels for > 15 minutes	Reposition Vessel until readings decrease
H2S, ppm	5	Continuous levels for > 15 minutes	Evacuate immediate work area to area of lower concentration

Above the Action Level, a beeping alarm and a red flashing light should indicate on the monitor when the result was detected. Once the action level for VOC's has been consistently above the limit for 15 minutes, the Air Monitoring Technician will then check for benzene by either installing a scrubber on the air monitoring unit or utilizing a detector tube. If benzene levels exceed the action level, notify the crew to leave the immediate area to an area of lower concentration (i.e., move to different location on the vessel or move to the living quarters or galley) and relocate the vessel. Additionally, the Air Monitoring Technician will immediately inform the Task Force Leader that a consistent reading has been confirmed and that the area of the vessel in which the monitor is located is considered a restricted area. The area will remain a restricted area until levels are consistently below the action limit. Air monitors indicate levels in the immediate environment surrounding the monitor.

At a minimum, benzene readings are collected any time the VOC's exceed action levels of 50 ppm. If a benzene result exceeds the action level, the Air Monitoring Technician will verify that the action level is sustained by collecting at least three samples over a 15 minute period. A new separator tube should be installed before conducting each verification test. If action level is confirmed, the area will be considered a restricted area until levels are consistently below the action limit for 15 minutes. The Air Monitoring Technician will notify the crew to leave the immediate area to an area of lower concentration. If the levels of benzene to unprotected workers in the living quarters exceed 0.5 ppm sustained for 15 minutes as confirmed by two instruments, the vessel should relocate off the location and the living quarters should be ventilated with clean air. Additionally, the Air Monitoring Technician will immediately inform the Task Force Leader that a consistent reading above the action levels has been confirmed and that the area of the vessel in which the monitor is located is considered a restricted area.

If there is potential to come in contact with hydrocarbon contaminated material, additional personal protective equipment should be considered based on the task including nitrile or neoprene gloves, PVC boots, and slicker suits.

At the Task Force Leader's discretion, the vessel may implement other controls to reduce airborne hazards below action limits such as moving portable industrial fans to increase air flow, repositioning the vessel, notifying standby boats with water cannons to break up sheen in the immediate area or requesting application of dispersants or foams from standby boats, if approved. It is recommended that each vessel install activated charcoal filters on the ventilation system intakes to provide a clean air environment within the crew quarters.

4.1 Action Levels for Safe Operations

Hazard	Action Level	Monitoring Condition	Actions
Flammable, %LEL	10%	Continuous levels confirmed by 2 or more monitors for 15 minutes	Notify the vessel captain and Task Force Leader that control measures are required. The vessel captain and Task Force Leader will evaluate and implement controls to reduce LEL levels below the 10% action level. (See more details in the paragraphs following this table.) Note: 1% by volume = 10,000 ppm. 10% LEL is typically about 1000 ppm which exceeds the IDLH for many organic volatiles Evacuate area

Lower Explosive Limit (LEL) action levels are designed to create an operating environment that is safe from a flammability standpoint but represents an inhalation hazard. The 10% LEL action level is designed to indicate that action is needed to reduce airborne hazard levels. This level is confirmed by detection of 10% or more LEL consistently on one or more monitors for 15 minutes. It should be noted that at 10% LEL, you should be reading simultaneous high VOC readings. At this level, the Air Monitoring Technician should notify the Vessel Captain and Task Force Leader that control measures are required. The Vessel Captain and Task Force Leader will evaluate and implement controls to reduce LEL levels below the 10% action limit such as moving or repositioning the vessel, notifying standby boats with water cannons to break up sheen in the immediate area or requesting application of dispersants from standby boats.

When the LEL level is between the 5% and 10% LEL action levels, notify the Vessel Captain and Task Force Leader that control measures are required. The Vessel Captain and Task Force Leader will evaluate and implement controls to reduce LEL levels below the 10% action level.

The 5% LEL action level or exceedence of the benzene (>0.5 ppm in living quarters) action level indicates when immediate action for safe operation is required. This level is confirmed by detection of 5 - 10% or greater LEL instantaneously on 1 or more monitors at the same time, or by detection of

>0.5 ppm benzene continuous in living quarters as confirmed by 1 or more monitors at the same time. At this level, the Air Monitoring Technician will immediately notify the Vessel Captain and Task Force Leader this level was confirmed. The Vessel Captain and Task Force Leader will suspend vessel operations and the vessel will relocate to the safe zone and await further instructions. A ship announcement will be made upon notification by the Air Monitoring Technician (or any crew member) to the Vessel Captain and Task Force Leader. The Vessel Captain and Task Force Leader will communicate moves through the appropriate SIMOPS Coordinator. Prior to re-entry, other support vessels will verify the LEL is below the action limit and communicate results to the affected vessel.

Utilize other support vessels or small crew boats in the vicinity that are equipped with Air Monitoring Techs and monitoring equipment to provide clearance monitoring. The clearance monitoring will provide information to the main vessel when it is safe for the vessel to re-enter the area.

5 Monitoring of Personnel

Organic Vapor Monitor (OVM) badges will be used to assess the full-shift personnel exposures to benzene and other hydrocarbons. OVM badges are to be placed on non-smoking personnel identified as having the highest potential for exposure. Air monitoring will be conducted on workers who spend the most time on the deck each day. A representative population to be sampled will be determined by the BP Industrial Hygienist or approved designate. OVM badges will be analyzed by Bureau Veritas, American Industrial Hygiene Association accredited laboratory, using an OSHA Method 7 for analysis. Results will be communicated to personnel and supervisors via the contact information provided to the Air Monitoring Technician. Note: OVM badges are designed to assess the exposure of an individual; they should not be shared or capped and re-used for additional shifts.

6 Data Quality and Documentation Management

The following applies to data quality and documentation management:

- All analytical air sample results will be sent to the Industrial Hygiene Lead in the Houston Command Center.
- Bureau Veritas, an AIHA Accredited Laboratory, located in Novi, Michigan will be used to analyze the samples
- The data packets will be reviewed and the data will undergo a data validation process.
- All real-time instruments will be calibrated according to the manufacturer recommendations or shall be maintained and calibrated as necessary to ensure consistent reliable data production.
- Calibration will be documented by the Air Monitoring Technician daily and documented on the calibration log.

- Real-time readings will be documented by handwritten notes, handheld PDA, or by the use of data logging capabilities of the instrument, if available.
- Real-time data will be entered onsite and drafts made available upon request.
- The IH Unit Leader in Houston will provide data summaries to the Safety Officer.

7 Respiratory Protection

This air monitoring plan ensures that personnel involved in spill control operations shall not be subjected to conditions where the use of a respirator will be required. All response organizations may follow their own respiratory protection programs in compliance with applicable governing regulatory bodies. If conditions change, as determined by air monitoring results, then the need for respiratory protection will be evaluated by BP Industrial hygiene and an appropriate respiratory protection program will be instituted.

8 Vessel Cabin Air Quality Control

Activated charcoal Heating Ventilating and Air Conditioning (HVAC) filters are recommended to reduce odor infiltration into living quarters. Below is contact information on the filters that have been installed on vessels and shown success. Please contact BP Onshore Logistics at 281-366-6968 to coordinate the ordering, distribution, and delivery to the vessel.

MWV Specialty Chemicals HM Filter -MeadWestvaco Activated Carbon Filtration 1-800-348-7196 www.mwvspecialtychemicals.com	Air Filters, Inc Honeycomb Carbon Air Filters 1-800-667-8563 www.airfilterusa.com	Air Flow Technology Carbon impregnated pleated filters 1-800-537-5454 www.airflowtechnology.com
Aeron GC Activated Carbon Filter Phone: +47 38 32 78 00 www.aeron.no	Flanders Filters, Inc. 531 Flanders Filter Road Washington, NC 27889 Phone: (252) 946-8081 Toll Free: (800) 637-2803 Fax: (252) 946-3425 www.flanderscorp.com	

Filter Change-out Frequency: To best determine a change-out frequency of filters for each vessel it is recommended to use VOC monitors to measure levels (on indoor-side of HVAC) twice daily. (i.e. once in the morning and again in the afternoon). If levels inside cabin exceed 50 ppm VOC action limit, change filter.

9 Qualified Personnel

Personnel who serve as Air Monitoring Technicians or Industrial Hygienists for this response shall be qualified in accordance with their respective companies'/organization's policies to perform initial site surveys and site monitoring using appropriate atmospheric equipment for oil spill response, recovery and remediation activities.

10 Roles & Responsibilities of Air Monitoring Technicians

The Air Monitoring Technician's role is to ensure that personnel performing spill clean-up operations or working on the deck of response vessels are not being overexposed to benzene and other hydrocarbons.

The Air Monitoring Technician's responsibilities include:

- Calibrating air monitoring instruments daily or prior to each use whichever is least often.
- Conducting air monitoring according to this plan and keeping written documentation of results.
- Conducting follow-up air monitoring within 15 minutes to confirm readings when results exceed the action limit.
- Informing the Vessel Captain and Task Force Leader / lead supervisor immediately when results exceed action limits, so that the supervisor / captain can implement controls to protect personnel.
- Provide periodic updates of air monitoring results to the lead supervisor / captain on the work site / vessel
- Provide copies of the air monitoring results to the Houston Industrial Hygiene Unit Leader and to the Houston IMT Safety Officer every 12 hours.

11 Equipment Decontamination

Air monitoring field instruments/equipment will be decontaminated if they are subjected to gross surface contamination.

12 Calibration and Maintenance of Field Instruments

The calibration, usage, and maintenance of field equipment and instrumentation will be in accordance with each manufacturer's specifications or applicable test/method specifications. At least one 4-gas meter / PID, one instrument capable of discrete monitoring for benzene, and replacement supplies [including calibration gas] will be maintained aboard the vessel.

13 Questions or Concerns:

Personnel have been instructed to contact their Supervisor if they have concerns about their health due to changing workplace conditions.

These Questions or concerns shall be directed to the Safety and Health Unit so they can be assessed:

Houma Command Center:

Safety Officer: 281-336-8154

Safety & Health Unit Leader: 281-336-8172

IH Unit Leader: 281-336-8176